

Trial Title: Fungicide timing response monitoring in winter barley at Morley.
Centre: Morley

Trial Code: WB21-05502

Variety: Craft

Objective: To record and monitor the yield responses to each of the component spray timings within a fungicide spray programme on winter barley.

Background and summary

This is the twelfth year that this trial has been running. It is supported through The Morley Agricultural Foundation (TMAF) as part of the NIAB Morley Long Term Studies (LoTS) programme.

Disease levels were low throughout the trial period. There were significant differences between treatment yields, with a 0.67 t/ha difference observed between the untreated (Treatment 1) and the highest yielding 3 spray programme containing Siltra Xpro (Treatment 6). This yield response was in the low to average range compared to the previous 11 years of trialling data from this site, with yield responses lower than that achieved between 2016 and 2019. The bulk of the yield response was distributed between the T1 + T2 standard spray programme giving a ca. 0.38 t/ha yield uplift, with the T3 adding ca. 0.32 t/ha.

Table 1. Products

Product	Active ingredient and concentration
Proline 275	Prothioconazole 275 g/l
Siltra Xpro	Bixafen 60 g/l and prothioconazole 200 g/l
Revystar XE	Fluxapyroxad 47.5 g/l and mefentrifluconazole 100 g/l

Table 2. Treatments and timings

Trt.	Growth stage timing and date of application				Comment
	GS25 09/03/21	GS31 27/04/21	GS39 11/05/21	GS61 01/06/21	
1	Untreated	-	-	-	Untreated
2	-	Siltra Xpro 0.6 l/ha	-	-	T1 only
3	-	Siltra Xpro 0.6 l/ha	Siltra Xpro 0.4 l/ha	-	Standard 2 spray programme
4	Proline 275 0.25 l/ha	Siltra Xpro 0.6 l/ha	Siltra Xpro 0.4 l/ha	-	Spring T0 + standard
5	-	Siltra Xpro 0.6 l/ha	Siltra Xpro 0.4 l/ha	Proline 275 0.25 l/ha	Standard + T3
6	-	Revystar XE 0.6 l/ha	Revystar XE 0.4 l/ha	Proline 275 0.25 l/ha	Alternate T3 programme

This trial was funded by NIAB Morley Long-term Studies programme

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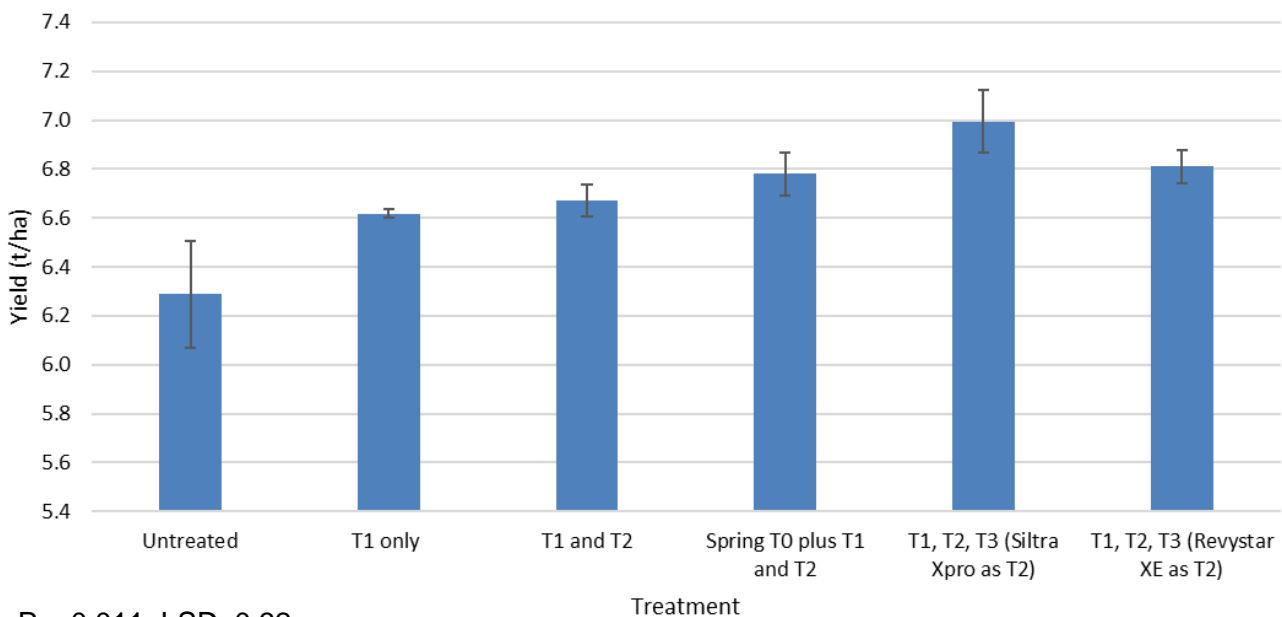
The site is part of a long-term experiment that has run at Morley for 12 years (supported by The Morley Agricultural Foundation). The experiment records a snapshot of the yield response to fungicide input and spray programme components in winter barley each year.

With regards data interpretation, the "T1+T2" response is based on a comparison of treatments 3 and 1; the "T3" response is based on treatments 5 or 6 and 3 and the "T0" is a comparison of treatments 4 and 3.

Results

Figure 1 shows the yield performance of Craft in untreated and fungicide treated plots. As in 2019 and 2020, disease levels in 2021 were low with net blotch, brown and yellow rust, powdery mildew and Ramularia undetectable at the final assessment on 1st July 2021. There were significant differences between treatment yields, with a 0.67 t/ha difference observed between the untreated (Treatment 1) and the highest yielding 3 spray programme containing Siltra Xpro (Treatment 6).

Figure 1. Yield (t/ha) ± SE for Craft at Morley in 2021.



Tables 3 and Table 4 show the 2021 yield response and multi-year yield response to fungicides respectively, for each spray timing. Response to an autumn T0 spray was not investigated in the 2021 trials; in previous years it has proven to be small and not economic. The mean yield response in 2021 to a 3 spray fungicide programme was ca. 0.7 t/ha with significant differences between treatments. This yield response was in the low to average range compared to the previous 11 years of trialling data from this site, with yield responses lower than that achieved between 2016 and 2019. The bulk of the yield response was distributed between the T1 + T2 standard spray programme giving a ca. 0.38 t/ha yield uplift, with the T3 adding ca. 0.32 t/ha.

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Table 3. Component yield responses (t/ha) for Craft

Comparison	Yield response (t/ha)
Benefit of T0 alone	0.11
Benefit T1 alone	0.33
Benefit of T2 alone	0.05
Benefit of T1 + T2 (standard programme)	0.38
Benefit of T3 alone where Siltra Xpro was used as T2	0.32
Benefit of T3 alone where Revystar XE was used as T2	0.14

Table 4. Multi-year fungicide yield responses, starting from 2008 at Morley.

Harvest	Timing				
	Autumn T0	Spring T0	T1 + T2	T3	3 spray vs 2 spray programme
2008	0.05	0.10	1.75	No data	
2011	0.00	0.08	0.37	0.00	
2012	0.65	0.73	0.34	0.36	
2013	0.01	0.00	0.51	0.33	
2014	0.12	0.27	1.87	0.53	
2015	0.47	0.49	0.35	0.67	
2016	0.00	0.04	1.24	0.56	
2017	0.00	0.13	1.73	0.36	
2018	0.05	0.08	2.29	0.32	0.31
2019	0.10	0.30	1.48	0.16	0.06
2020	-	0.10	0.20	0.10	0.10
2021		0.11	0.38	0.32	0.32
Mean response	0.15	0.20	1.04	0.38	0.2
Mean total response					1.97

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Appendices

Ramularia detection via qPCR

During this trial, leaf samples were harvested for DNA extraction and subsequent detection of ramularia via qPCR. Fifty leaf samples were collected per plot (across all replicates) from all treatments, at growth stages 31, 39 and 59. Leaves were then pooled into ten groups of five for DNA extraction and qPCR was carried out to detect the pathogen. Due to the sensitivity of the detection method, it was possible to detect ramularia within the trial despite no visible symptoms being observed throughout the growth stages. The highest levels of ramularia were detected at GS31, with up to 20% of DNA samples within a given treatment testing positive for the pathogen (Table 6). Levels of ramularia across the treatments dropped substantially from GS39 onwards in treated plots, in contrast to 13% of DNA samples which tested positive for ramularia at GS59. This could suggest a potential treatment effect at latter growth stages. It was not possible to detect any reliable differences between the untreated and treated plots at GS31, or between any of the fungicide treatments at latter growth stages.

Table 6. % of Ramularia detected in leaf samples collected from treated and untreated plots of Craft at Morley in 2020.

		<i>% of DNA samples testing positive for Ramularia</i>		
Trt no.	Treatment	GS31	GS39	GS59
1	Untreated	10	3	13
2	T1 Only	17	7	0
3	Standard	10	0	0
4	Standard (No CTL)	13	0	3
5	Spr T0 + Standard	20	3	7
6	Standard + T3	10	3	3

Molecular detection of foliar pathogens

Net blotch molecular data is currently delayed due to a combination of technical problems and reduced staff time in the laboratory due to Covid-19 restrictions. Report will be amended when data is available.

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Field details

Trial Code:	WB21-05502
Trial Centre:	Morley
Trial Location:	Morley
Crop:	Winter barley
Previous Crop:	Spring Barley
Soil Texture:	Sandy Loam
Total N/ha Applied:	135 kgN/ha
Drill Date:	18/10/20
Seed Rate:	300 seeds/m ²
Drilled plot size:	2m x 12m
Replicates:	3
Harvest date:	21/07/21

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